

**AMENDMENTS TO THE CLAIMS**

1-13. (canceled)

14. (currently amended): A method of designing and producing a polyketide synthase (PKS) gene ~~capable of producing a desired polyketide~~, which method comprises:

(A) (a) defining the structure of the desired polyketide by a first string of alphanumeric symbols, wherein each symbol in the first string represents a monomer unit of the polyketide,

(b) comparing the first string of alphanumeric symbols to a second string of alphanumeric symbols from a database,

wherein the database comprises at least one second string of alphanumeric symbols representing a known polyketide, and wherein each alphanumeric symbol in the second string represents a monomer unit of the known polyketide ~~and also represents a polyketide module of the polyketide synthase~~,

(c) identifying a common alphanumeric symbol or continuous sequence of alphanumeric symbols in said first and second strings,

(d) ~~generating an alignment~~ a third string, wherein the ~~alignment consists of~~ third string comprises a combination of common alphanumeric symbols identified from ~~the database such that the sequence of alphanumeric symbols in the alignment matches the first string~~ step (c), and wherein the ~~alignment~~ third string represents the structure of a PKS gene capable of producing the desired polyketide, and

(e) storing or displaying the ~~alignment~~ third string [(;), [(or)] and

(f) using the third string representing the structure of the PKS gene to produce the desired polyketide; or

(B) the method of (A), wherein steps (b) and (c) are repeated.

15. (currently amended): The method of claim 14, wherein more than one ~~alignment~~ third string of alphanumeric symbols is generated and displayed.

16. (currently amended): The method of claim 15, wherein the ~~alignments~~ third strings that are generated are rated in an order based on one or more parameters.

17. (previously presented): The method of claim 16, wherein the parameters are selected from the group consisting of non-native polyketide module interfaces and non-native polyketide protein interfaces.

18. (currently amended): The method of claim 14, wherein [[A]] the PKS gene is designed using a computer-readable medium embodying a set of program instructions configured to enable a computing device to perform the method steps for designing [[a]] the PKS gene capable of producing [[a]] the desired polyketide, the method steps comprising:

(A) (a) receiving a first string of alphanumeric symbols representing the structure of the desired polyketide, wherein each symbol in the first string represents a monomer unit of the desired polyketide;

(b) comparing the first string of alphanumeric symbols to a second string of alphanumeric symbols from a database;

wherein the database comprises at least one second string of alphanumeric symbols representing a known polyketide, and wherein each alphanumeric symbol in the second string represents a monomer unit of the known polyketide and also represents a module of the polyketide synthase;

(c) identifying a common alphanumeric symbol or continuous sequence of alphanumeric symbols in said first and second strings;

(d) generating an alignment, wherein the alignment consists of a combination of common alphanumeric symbols identified from the database such that the sequence of alphanumeric symbols in the alignment matches the first string, and wherein the alignment represents the structure of a new PKS gene capable of producing the desired polyketide, and

(e) storing or displaying the alignment; or

~~(B) the method of (A), wherein steps (b) and (c) are repeated.~~

19. (currently amended): A computer-implemented method for designing and producing a PKS gene, ~~capable of producing a desired polyketide~~ comprising:

(A) (a) receiving a first string of alphanumeric symbols representing the structure of the desired polyketide, wherein each symbol in the first string represents a monomer unit of the desired polyketide,

(b) comparing the first string of alphanumeric symbols to a second string of alphanumeric symbols from a database,

wherein the database comprises at least one second string of alphanumeric symbols representing a known polyketide, and wherein each alphanumeric symbol in the second string represents a monomer unit of the known polyketide ~~and also represents a module of the polyketide synthase,~~

(c) identifying a common alphanumeric symbol or continuous sequence of alphanumeric symbols in said first and second strings,

(d) generating ~~an alignment a third string~~, wherein the alignment third string consists of a combination of common alphanumeric symbols identified from ~~the database such that the sequence of alphanumeric symbols in the alignment matches the first string~~ step (c), and wherein the alignment third string represents the structure of a PKS gene capable of producing the desired polyketide, and

(e) storing or displaying the alignment third string ~~[[;]], [[or]] and~~

(f) using the third string representing the structure of the PKS gene to produce the desired polyketide; or

~~(B) the method of (A), wherein steps (b) and (c) are repeated.~~

20. (canceled)

21. (currently amended): The method of claim 14, wherein more than one alignment third string is generated and stored.

22. (currently amended): The method of claim 21, wherein the ~~alignments~~ third strings that are generated are rated in an order based on one or more parameters.

23. (previously presented): The method of claim 22, wherein the parameters are selected from the group consisting of non-native polyketide module interfaces and non-native polyketide protein interfaces.

24. (currently amended): ~~The alignment representing the structure of the new polyketides synthase (PKS) gene designed by the method of claim 14~~  
~~or claim 19~~ A computer-readable medium embodying a set of program instructions configured to enable a computing device to perform the method steps of claim 14.

25. (new): A PKS gene designed and produced by the method of claim 14.

26. (new): A PKS gene designed and produced by the method of claim 18.

27. (new): A PKS gene designed and produced by the method of claim 19.

28. (new): A PKS gene designed and produced by the method of claim 24.